

Day 1 – Monday, November 30, 2015

0800 – 1000 Introduction of Attendees, Meeting Procedures, and All-Tracks Discussion

1000 – 1015 Break; Separate into Different Meeting Track (Section 6 and Section 7)

1015 – 1045 Introductions, Review Meeting Agenda, and State AOC SOW Section Purposes

----- Introductions

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*----- AOC SOW Section 6 Objective

a. "Determine the feasibility of alternatives for investigating and remediating releases from the Facility" including:

- i. "...the response to the January 2014 release from Tank #5 and an evaluation and discussion of potential remediation methods for the January 2014 Tank #5 release and any future releases"

*----- AOC SOW Section 7 Objective

- a. "Monitor and characterize the flow of groundwater around the Facility"
- b. "Update the existing Groundwater Protection Plan (GPP) to include response procedures and trigger points in the event that contamination from the Facility shows movement toward any drinking water well."

*----- Section 6 and Section 7 Scoping Meeting Objectives

a. General

- i. Site history, conditions, environment, limitations, and challenges
- ii. Relationship between Section 6 & 7 tasks
- iii. Review existing data and models; identify data gaps and other needs
- iv. Discussion of what is and is not feasible

b. Specific

- i. Outline major tasks to achieve AOC-SOW objectives
- ii. Discuss need to identify interim deliverables and when progress reports will be due.
- iii. Discuss framework and criteria to be used in implementing the major tasks including decision criteria.
- iv. Discuss potential investigation and analysis details
 - Details will be finalized in the Scopes of Work (Workplans) for each AOC-SOW Section, to be developed upon regulators' acceptance of the Final Scoping Meeting

c. Review of Agenda/Order of Main Topics

1045 – 1130 Site Setting: Land Uses, Topography, Water Resources, Regional Geology

*----- Facility Description and History

*----- Location and Setting

- a. Surrounding land use and other potential point sources
- b. Topography, surface water, and surface soils
- c. Existing regional groundwater drinking water supply wells: Red Hill, Halawa, Moanalua
- d. Potential future use for drinking water 1 mile radius

1130 – 1230 Lunch

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1230 – 1430 Site Hydrogeology: Preliminary Geologic Conceptual Site Model CSM)

- * ~~-----~~ ~~---~~ Vadose Zone Geology
 - a. Hawaiian lava flows and geologic features and properties
 - b. Pahoehoe, a'a, clinker, tuff, dikes and sills, strike and dip of flow bedding/planes
 - c. Permeability, confining layers, voids, flow directions, valley fill zones.
 - d. Previous Red Hill investigations: boring logs and rock cores
- * ~~-----~~ ~~---~~ Preliminary Geologic CSM of the Vadose Zone Underlying the Facility as relevant to identified receptors.

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1430 – 1445 Break

1445 – ~~1700~~ ~~1640~~ Previous Investigations (Pre-2014): Results, Existing Models and CSM

- * ~~-----~~ ~~---~~ Summary of Previous Investigations
- * ~~-----~~ ~~---~~ Releases and Development of Existing Groundwater Monitoring Well Network
 - a. Well construction details
- * ~~-----~~ ~~---~~ Boring Logs and Rock Cores – Aquifer Substrate Composition
- * ~~-----~~ ~~---~~ Results of Previous Investigations – Environmental Sampling and Analysis
 - a. Water level and LNAPL gauging
 - b. Groundwater sampling and laboratory chemical analysis
 - c. Soil vapor results
- * ~~-----~~ ~~---~~ Groundwater Flow Model
 - a. Limitations
 - b. ~~Known~~ data gaps, and
 - c. ~~opportunities~~ Opportunities for improvement
- * ~~-----~~ ~~---~~ Contaminant Fate and Transport (CF&T) Model
 - a. Limitations
 - b. ~~Known~~ data gaps, and
 - c. ~~Opportunities~~ Opportunities for improvement

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1640 – 1700

- * ~~-----~~ ~~---~~ Review of Action Items for Monday 11/30 discussions

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Day 2 – Tuesday, December 1, 2015

0800 – 1030 January 2014 Release: Response, Investigations, and Results

- * ~~Release Points, Detection, Fuel Type, and Quantity~~
 - a. Review of ~~any currently~~ available information
 - b. ~~Addressing knowledge gaps~~

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- * ~~Response and Investigations~~
 - a. Installations of new monitoring wells (RHMW06 and RHMW07)
 - b. Vadose zone evaluation
 - c. Soil vapor results

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- * ~~Environmental Sampling and Analysis~~
 - a. Chemicals of potential concern (COPCs)

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1030 – 1045 Break

1045 – 1200 AOC SOW Section 6 In-Depth Discussion: Objectives and Tasks

- * ~~Overall AOC SOW Section 6 Objective~~
 - a. "Determine the feasibility of alternatives for investigating and remediating releases from the Facility"

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- * ~~What are the Major Tasks Needed to Achieve Section 6 Objectives~~
 - a. Task #1: Evaluate Vadose Zone Geology

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- b. Task #2: Investigation Light Non-Aqueous Phase Liquid (LNAPL)
- c. Task #3: Identify Chemicals of Potential Concern (COPCs)
- d. Task #4: Monitoring Network – Existing and Newly Proposed
- e. ~~Task #5: Potential Remediation Methods~~
- f. ~~Others?~~
- g. ~~Final list of tasks needed to meet Section 6 objectives~~
- h. ~~Timeline for completion of Major Tasks (may need to coordinate with Section 7 tasks)~~

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1200 – 1300 Lunch

1300 – 1400 Task #1: Evaluate Vadose & Saturated Zone Geology

- * ~~Geologic Mapping~~
 - a. Previous boring logs and rock cores
 - b. Aerial imagery
 - c. Field mapping
- * ~~Mapping to Strategically Place New Monitoring Wells (Discussed Further Below)~~
 - a. Acquire additional information from the advancement of new borings/wells
- * ~~Deliverable and timeline for Task #1~~

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Commented [RT1]: DOH wishes to distinguish between the Tank 5 CSM for the Jan 2014 release and the larger Area-wide CSM that will incorp Section 7. Tank 5 CSM is a subset of larger CSM.

1400 – 1500 Task #2: Investigate Light Non-Aqueous Phase Liquid (LNAPL)

- * ~~Brief Review of Tank 5 CSM and area-wide CSM: Constraints, Potential Inhibitors, and Objectives~~
 - a. ~~Discussion of vadose & saturated heterogeneity:~~
 - b. ~~Fuel properties and potential for migration~~
 - c. ~~Natural Attenuation combined with interbedded voids and confining layers, potentially:~~
 - ~~LNAPL difficult to locate if within unpredictable void spaces~~

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ii. Difficult to remediate or remove

 « Natural attenuation would be expected to occur

iii. Retards flow of LNAPL to groundwater (i.e., potential risk of drilling)

Commented [PB3]: These seem more like conclusions rather than agenda topics.

1500 – 1515 Break

1515 – 1600 Task #2: Investigate LNAPL (Continued)

- Consider Vadose Zone LNAPL transport
- * ☐ Consider Vadose Zone Vapor Transport Modeling
 - a. Utilize existing soil vapor data
 - b. Evaluate its use as leak detection (e.g., concentrations did not exceed immediately after the leak, level of protectiveness, etc.)
- * ☐ Potential Non-Intrusive Technologies for LNAPL
 - a. Electroresistivity methods
 - b. Other geophysical techniques (i.e., MIP, LIF, UVOSS, etc.)
 - c. Applicability and practicality of available methods
 - d. To be evaluated in greater detail during preparation of scope of work
- * ☐ Deliverable and timeline for Task #2

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1600 – ~~1700~~ 1645 Task #3: Identify Chemicals of Potential Concern (COPCs)

- * ☐ Review of Existing Data including: Present & Past fuel stored, former Oily Waste Disposal Pit, asphalt plant.
- * ☐ Identify COPCs
- * ☐ Recommend COPCs For:
 - a. Analytical testing
 - b. Parameter inputs into CF&T model
- * ☐ Sampling and Chemical Analyses Methods: Field and Laboratory
- * ☐ Deliverable and timeline for Task #3

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1645 – 1700

- * ☐ Review of Action items for Tuesday Dec 1 discussions

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Day 3 – Wednesday, December 2, 2015

0800 – 0900 All-Tracks Discussion on Progress

0900 – 1030 Section 6 Task #4: Monitoring Network – Existing and Newly Proposed

* Potential Well Placement

a. Addressing groundwater flow model data gaps –

i. Evaluate Discussion of the potential regional flow north and mauka of the prison

Discussion of potential regional flow West from Red Hill, as indicated in the second modeling report from 2010

ii. Discussion of Evaluate the resistance to flow provided by the valley fill

iii. Refine modeling boundary condition assumptions

b. Addressing CF&T model data gaps (and potentially addressing future releases) –

i. sentinel well location (2-3) in stream fill by H3 with geophysics

i. Consider installing sentinel wells between the release and the Halawa Shaft

ii. Consider installing sentinel wells between the release and the Moanalua wells

iii. Consider additional sentinel wells upgradient of the Red Hill Shaft

iv. Consider sentinel well upgradient of the nearby (downgradient) housing

c. Evaluate distribution of natural attenuation parameters

d. Evaluate aquifer properties and refine geological profiles and model inputs

i. Borehole logging, geotechnical soil sampling and testing, and potential geophysical methods (if found feasible)

ii. Investigate the extent weathered basalt/saprolite layer that was recommended to be added and considered to the groundwater flow model

iii. Better information on the valley fill and its potential effects

* e. Potential Well Placement

i. Location for 2 to 3 wells in valley fill near H3 with geophysics

ai. Consider northwest of Halawa Prison

bi. Consider south of Halawa Industrial Park

cii. Consider south of the Facility Potential remedial alternatives and future use

i. Recovery and treatment

ii. Bioremediation (i.e., bioventing, etc.)

iii. Expand monitoring network to include new and existing well locations

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1030 – 1045 Break

1045 – 1200 Task #4: Monitoring Network (Continued)

* Potential Well Placement (Continued Discussion)

* Well Construction Details

* a. Consider potential data use, representativeness, and future use (i.e., extraction, etc.)

* Deliverable and timeline for Task #4

1200 – 1300 Lunch

1300 – 1500 Task #45: Monitoring Network (Continued) Potential Remediation Methods

* Potential remedial alternatives and future use

* Potential Well Placement

a. Consider northwest of Halawa Prison

b. Consider south of Halawa Industrial Park

c. Consider south of the Facility i. Recovery and treatment

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ii. Bioaugmentation (i.e., bioventing, etc.)

iii. Expand monitoring network to include new and existing well locations

- Deliverable and timeline for Task #5

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~~1200 – 1300 Lunch~~

~~1300 – 1500 Task #4: Monitoring Network (Continued)~~

~~□ Potential Well Placement (Continued Discussion)~~

~~□ Well Construction Details~~

~~a. Consider potential data use, representativeness, and future use (i.e., extraction, etc.)~~

1500 – 1515 Break

1515 – 1615 AOC SOW Section 7 In-Depth Discussion: Objectives and Tasks

☛ Overall AOC-SOW Section 7 Objective

- a. “Monitor and characterize the flow of groundwater around the Facility”
- b. “Update the existing Groundwater Protection Plan to include response procedures and trigger points in the event that contamination from the Facility shows movement toward any drinking water well”

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☛ Major Tasks to Achieve Section 7 Objective (Interconnected to Section 6)

- a. Task #56: Update the Existing Groundwater Model
- b. Task #67: Evaluate Whether to Perform a Tracer Study
- c. Task #78: Evaluate Potential Remedial Alternatives – Feasibility, Methodologies

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1615 – 1700 1645 Task #56: Update the Existing Groundwater Model

☛ Strengths and Limitations of Mathematical Modeling of Red Hill

- a. MODFLOW & RT3D are state-of-the-art flow and transport models that are particularly suitable for modeling petroleum releases in porous media. Model choice and rationale
- b. Much effort has been expended to create a robust model, which can be improved and used. Conduct new modeling effort or build off existing work
- c. Model inputs and data needs: The site aquifer substrate is likely amenable to equivalent porous flow modeling
- d. A model is only as good as its inputs (i.e., site characterization). The heterogeneity of Red Hill imposes inherent limitations to any mathematical model

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☛ Other Modeling Programs and Considerations

- a. Freshwater flow only
- b. Density dependent flow
- c. Desktop Catchment Water Modeling

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☛ Proposed Uses of the Mathematical Model

- a. Evaluate placement of new wells
- b. Set and revise site-specific risk based levels (SSRBLs)
- c. Evaluating potential remediation alternatives and develop contingency plans
- d. Provide input to and support the Risk and Vulnerability Assessment (AOC SOW Section 8) for hypothetical scenario considerations

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1645 – 1700

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☛ Review of Action items for Wednesday Dec 2 discussions

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Day 4 – Thursday, December 3, 2015

0800 – 1000 Task #56: Update the Existing Groundwater Model (Continued)

* Recommended Modeling Efforts

- a. Extent of groundwater flow model
- b. Incorporate ~~Discussion of~~ data obtained since 2010 and ~~input other potential~~ model improvements:
 - i. Literature review to verify appropriateness of layer geotechnical parameters
 - ii. New groundwater monitoring well logs (re-evaluate model layers)
 - iii. Consider adding weathered basalt (saprolite) layer above basalt layer
 - iv. Groundwater elevation gauging data
 - v. Revised recharge data (re-evaluate model boundary conditions)
 - vi. Potential well placement
- c. ~~How will~~ Incorporate new data obtained during implementation of ~~previous~~ Section 6 tasks ~~be incorporated into Model~~
 - i. Stratigraphy
 - ii. Groundwater elevations
 - iii. COPCs analyses
- d. ~~Discussion of~~ Revise SSRBLs and updated risk assessment
- e. Basis and consideration of modeling codes/types
- f. Scenarios to be evaluated
- g. Calibration/Validation of model

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* Interim deliverables and timeline for Task #6

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1000 – 1015 Break

1015 – 1200 Task #67: Update CF&T Model and Evaluate Whether to Perform a Tracer Study

Options for initial tracer test study to obtain quick data on actual flow direction

* Update CF&T Model

- a. Use updated groundwater model (i.e., flow parameter inputs [velocity, direction, dispersion], etc.)
- b. Contaminant species to be evaluated in model
- c. Transport assumptions (i.e., solubility, etc.)
- d. Degradation evaluation and inputs
- e. Scenarios to be evaluated
- f. Other model considerations
- g. Calibration/Validation of model

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* Applicability, Feasibility, and Appropriateness of Conducting a Tracer Study

- a. Valuable input into CF&T model
- b. Limitations to a tracer study (i.e., implementability, timeframe, etc.)
- c. Possible tracer study designs
- d. Improper design can potentially result in a very expensive (in cost and time) failure

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1200 – 1300 Lunch

1300 – 1400 Task #78: Evaluate Potential Remedial Alternatives – Feasibility, Methodologies

* Evaluate and Recommend Remedial Alternatives Based on Results of Aforementioned Tasks

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a. Initial list of criteria for evaluating ~~feasible~~ remedial alternatives against the following criteria:

- i. Overall Protection of Human Health and the Environment
- ii. Compliance with Other Federal and State Requirements
- iii. Long-Term Effectiveness and Permanence
- iv. Reduction of Toxicity, Mobility, or Volume through Treatment
- v. Short-Term Effectiveness
- vi. Implementability
- vii. Cost
- viii. Projected State Acceptance
- ix. Project Community Acceptance
- x. ~~Other?~~

1400 – 1500 ~~Open Discussion~~ Discussion of Actions items, review of Scope Outline

1500 – 1515 Break

1515 – 1630 Path Forward, Schedule Milestones, and Review Action Items/Decision Points

☛ AOC SOW Schedule for Section 6 and Section 7

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☛ Potential Collaboration Opportunities with the University of Hawaii on Section 6 and Section 7

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☛ Additional Scoping Meetings Required?

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